

Sequences

CDR Sequences

SEQ ID NO. 1	NYWLG
SEQ ID NO. 2	DIYPGGGYTNYNEKFKG
SEQ ID NO. 3	DIYPGGSYTNYNEKFKG
SEQ ID NO. 4	YDAAGPWFAY
SEQ ID NO. 5	YDAAGPGFAY
SEQ ID NO. 6	YDNHYFDY
SEQ ID NO. 7	RSSQSIVHSNGNTYLE
SEQ ID NO. 8	RSSQSLLHSNGNTYLH
SEQ ID NO. 9	KSSQSLLHSDGKTYLY
SEQ ID NO. 10	KVSNRFS
SEQ ID NO. 11	EVSSRFS
SEQ ID NO. 12	FQGSHPYPT
SEQ ID NO. 13	SQSTHPYPT

CDR Sequences (canonical structure variants)

SEQ ID NO. 14	NYWIG
SEQ ID NO. 15	NYWMG
SEQ ID NO. 16	NYWWG
SEQ ID NO. 17	NYWVG
SEQ ID NO. 18	DIYPGGDYTNYNEKFKG
SEQ ID NO. 19	DIYPGGNYTNYNEKFKG

SEQ ID NO. 20	DIYTGGGYTNYNEKFKG
SEQ ID NO. 21	DIYTGGDYTNYNEKFKG
SEQ ID NO. 22	DIYTGGNYTNYNEKFKG
SEQ ID NO. 23	DIYTGGSYTNYNEKFKG
SEQ ID NO. 24	DIYAGGGYTNYNEKFKG
SEQ ID NO. 25	DIYAGGDYTNYNEKFKG
SEQ ID NO. 26	DIYAGGNYTNYNEKFKG
SEQ ID NO. 27	DIYAGGSYTNYNEKFKG

SEQ ID NO. 28	RPSQSIVHSNGNTYLE
SEQ ID NO. 29	RSSQSLVHSNGNTYLE
SEQ ID NO. 30	RSSQSIVHSNGNTYFE
SEQ ID NO. 31	RPSQSLVHSNGNTYLE
SEQ ID NO. 32	RPSQSIVHSNGNTYFE
SEQ ID NO. 33	RSSQSLVHSNGNTYFE
SEQ ID NO. 34	RPSQSLLHSNGNTYLH
SEQ ID NO. 35	RSSQSILHSNGNTYLH
SEQ ID NO. 36	RSSQSLLHSNGNTYFH
SEQ ID NO. 37	RPSQSILHSNGNTYLH
SEQ ID NO. 38	RPSQSLLHSNGNTYFH
SEQ ID NO. 39	RSSQSILHSNGNTYFH
SEQ ID NO. 40	KPSQSLLHSDGKTYLY
SEQ ID NO. 41	KSSQSILHSDGKTYLY
SEQ ID NO. 42	KSSQSLLHSDGKTYFY
SEQ ID NO. 43	KPSQSILHSDGKTYLY
SEQ ID NO. 44	KPSQSLLHSDGKTYFY
SEQ ID NO. 45	KSSQSILHSDGKTYFY

Variable heavy chains VH

SEQ ID NO. 46

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSS

SEQ ID NO. 47

QVQLKQSGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGSYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCARYDNHYFDYWGQGTTLTVSS

SEQ ID NO. 48

QVQLKQSGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTLTVSS

SEQ ID NO. 49

EVKLVESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTSVTVSS

SEQ ID NO. 50

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 51

EVKLVESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 52

QVQLKQSGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTLTVSA

SEQ ID NO. 53

QVQLKQSGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 54

QVTLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTSTVTVSS

SEQ ID NO. 55

QVQLKQSGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTSTVTVSS

SEQ ID NO. 56

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTLTVTVSS

SEQ ID NO. 57

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYYCAYYDAAGPWFAYWGQGTTLTVTVSS

SEQ ID NO. 58

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSRLTSEDSAVYFCAYYDAAGPWFAYWGQGTTLTVTVSS

SEQ ID NO. 59

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMELSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTLTVTVSS

SEQ ID NO. 60

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPQGGLERIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTLTVTVSS

SEQ ID NO. 61

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTLTVSS

SEQ ID NO. 62

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSTSTAYMELSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 63

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSTSTAYMELSSLRSEDSAVYFCAYYDAAGPWFAYWGQGTTLTVSS

SEQ ID NO. 64

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSTSTAYMELSSLTSEDSAVYYCAYYDAAGPWFAYWGQGTTLTVSS

SEQ ID NO. 65

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSTSTAYMELSSLRSEDTAVYFCAYYDAAGPWFAYWGQGTTLTVSS

SEQ ID NO. 66

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSTSTAYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 67

QVQLVQSGAEVKKPGASVKVPCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSTSTAYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTTLTVSS

SEQ ID NO. 68

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSTSTAYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTTLTVSS

SEQ ID NO. 69

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSTSTAYMELSSLRSEDVAVYYCAYYDAAGPWFAYWGQGTTLTVSS

SEQ ID NO. 70

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSTSTAYMELSSLRSEDVAVYYCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 71

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSTSTAYMELSSLTSEDSAVYYCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 72

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSTSTAYMELSSLRSEDVAVYFCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 73

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYYCAYYDAAGPWFAYWGQGTTVTVSS

~~SEQ ID NO. 74~~ - - - - -

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSTSTAYMELSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 75

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE
KFKGRVTITADTSTSTAYMELSSLRSEDVAVYFCAYYDAAGPWFAYWGQGTTLTVSS

SEQ ID NO. 76

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE
KFKGRVTITADTSTSTAYMELSSLRSEDVAVYYCAYYDAAGPWFAYWGQGTTLTVSS

SEQ ID NO. 77

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE
KFKGRVTITADTSTSTAYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTLLTVSS

SEQ ID NO. 78

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWMGDIYPGGGYTNYNE
KFKGRVTITADTSTSTAYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTLLTVSS

SEQ ID NO. 79

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWMGDIYPGGGYTNYNE
KFKGRVTMTRDTSTSTVYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTLLTVSS

Variable light chains

SEQ ID NO. 80

DIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFG
VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRA

SEQ ID NO. 81

DIVITQTPLSLPVSLGDQASISCRSSQSLLHSNGNTYLHWYLQKPGQSPKLLIYKVSNRFG
VPDRFSGSGSGTDFTLKISRVEAEDLGVYFCSTHVPYTFGGGTKLEIKRA

SEQ ID NO. 82

DIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFG
VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRA

SEQ ID NO. 83

DVLMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFG
VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRA

SEQ ID NO. 84

DVLMTQTPLSLPVS LGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVS NRFSG
VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLELKRA

SEQ ID NO. 85

DIQMTQSPLSLPVTPGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVS NRFSG
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 86

DIQMTQSPLSLPVTPGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVS NRFSG
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 87

DIQMTQSPLSLPVTPGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPQLLIYKVS NRFSG
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 88

DIQMTQSPLSLPVTPGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPQLLIYKVS NRFSG
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 89

~~DIVMTQSPLSLPVTPGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVS NRFSG~~
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 90

DIVMTQSPLSLPVTPGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVS NRFSG
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 91

DIVMTQSPLSLPVTPGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPQLLIYKVS NRFSG
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 92

DIVMTQSPLSLPVTTPGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPQLLIYKVSNRFSG
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGQGTKVEIKRA

SEQ ID NO. 93

DIVMTQTPLSLPVTTPGQPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPQLLIYKVSNRFSG
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGQGTKVEIKRA

SEQ ID NO. 94

DIVMTQTPLSLSVTPGQPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPQLLIYKVSNRFSG
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGQGTKVEIKRA

V_H/V_L pairs

Mouse antibody

Karo1 SEQ ID NO. 46

SEQ ID NO. 80

Karo2 SEQ ID NO. 47

SEQ ID NO. 81

Karo3 SEQ ID NO. 48

SEQ ID NO. 80

Karo4 SEQ ID NO. 50

SEQ ID NO. 80

Karo5 SEQ ID NO. 53

SEQ ID NO. 82

Karo6 SEQ ID NO. 52
 SEQ ID NO. 83

Karo7 SEQ ID NO. 55
 SEQ ID NO. 83

Karo8 SEQ ID NO. 54
 SEQ ID NO. 80

Karo9 SEQ ID NO. 51
 SEQ ID NO. 83

Karo10 SEQ ID NO. 49
 SEQ ID NO. 80

humanized sequences

Karo11 SEQ ID NO. 56
 SEQ ID NO. 90

Karo12 SEQ ID NO. 57
 SEQ ID NO. 90

Karo13 SEQ ID NO. 57
 SEQ ID NO. 86

Karo14 SEQ ID NO. 58
 SEQ ID NO. 87

Karo15 SEQ ID NO. 56
 SEQ ID NO. 91

Karo16 SEQ ID NO. 59
 SEQ ID NO. 91

Karo17 SEQ ID NO. 60
 SEQ ID NO. 87

Karo18 SEQ ID NO. 61
 SEQ ID NO. 90

Karo19 SEQ ID NO. 56
 SEQ ID NO. 88

Karo20 SEQ ID NO. 56
 SEQ ID NO. 85

Karo21 SEQ ID NO. 59
 SEQ ID NO. 90

Karo22 SEQ ID NO. 62
 SEQ ID NO. 90

Karo23 SEQ ID NO. 59
 SEQ ID NO. 86

Karo24 SEQ ID NO. 74
 SEQ ID NO. 92

Karo25 SEQ ID NO. 63
 SEQ ID NO. 87

Karo26 SEQ ID NO. 74
 SEQ ID NO. 87

Karo27 SEQ ID NO. 74
 SEQ ID NO. 89

Karo28 SEQ ID NO. 74
 SEQ ID NO. 85

Karo29 SEQ ID NO. 64
 SEQ ID NO. 86

Karo30 SEQ ID NO. 74
 SEQ ID NO. 86

Karo31 SEQ ID NO. 63
 SEQ ID NO. 86

Karo32 SEQ ID NO. 65
 SEQ ID NO. 85

Karo33 SEQ ID NO. 65
 SEQ ID NO. 86

Karo34 SEQ ID NO. 66
 SEQ ID NO. 85

Karo35 SEQ ID NO. 67
 SEQ ID NO. 87

Karo36 SEQ ID NO. 68
 SEQ ID NO. 86

Karo37 SEQ ID NO. 72
 SEQ ID NO. 88

Karo38 SEQ ID NO. 69
 SEQ ID NO. 90

Karo39 SEQ ID NO. 70
 SEQ ID NO. 90

Karo40 SEQ ID NO. 69
 SEQ ID NO. 92

Karo41 SEQ ID NO. 73
 SEQ ID NO. 86

Karo42 SEQ ID NO. 69
 SEQ ID NO. 89

Karo43 SEQ ID NO. 71
 SEQ ID NO. 92

Karo44 SEQ ID NO. 56
 SEQ ID NO. 86

Karo45 SEQ ID NO. 65
 SEQ ID NO. 92

Various single-chain Fv formats

SEQ ID NO. 95

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSSASSGG
GGSGGGGSGGSARDIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSP
KLLIYKVSNRFSGVDPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEI
KRAAAHHHHHHGAAEQKLISEEDLNAA

SEQ ID NO. 96

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGT TVTVSSASSGS
GSSADIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVS
NRFSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHH
HHGAAEQKLISEEDLNGAA

SEQ ID NO. 97

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGT TVTVSSASSGG
SSADIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVS
NRFSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHH
HHHGAAEQKLISEEDLNGAA

SEQ ID NO. 98

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGT TVTVSSASSGS
SADIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVS
NRFSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHH
HHHHGAAEQKLISEEDLNGAA

SEQ ID NO. 99

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGT TVTVSSASSSS
ADIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVS
NRFSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHH
HHHHGAAEQKLISEEDLNGAA

SEQ ID NO. 100

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGT TVTVSSASSSA
DIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVS
NRFSG

VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHHHHGA
AEQKLISEEDLNGAA

SEQ ID NO. 101

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGT TVTVSSASSAD
IQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSGV
PDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHHHHGAA
EQKLISEEDLNGAA

SEQ ID NO. 102

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGT TVTVSSASADI
QMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSGVP
DRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHHHHGAAE
QKLISEEDLNGAA

SEQ ID NO. 103

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGT TVTVSSAADIQ
MTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSGVPD
RFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHHHHGAAEQ
KLISEEDLNGAA

SEQ ID NO. 104

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGT TVTVSSADIQM
TQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSGVPDR
FSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHHHHGAAEQK
LISEEDLNGAA

SEQ ID NO. 105

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGT TVTVSSDIQMT
QTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSGVPDRF
SGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHHHHGAAEQKL
ISEEDLNGAA

SEQ ID NO. 106

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGT TVTVSDIQMTQ
TPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSGVPDRFS
GSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHHHHGAAEQKLI
SEEDLNGAA

Murine Antibodies

SEQ ID NO. 107

DIVITQTPLSLPVSLGDQASISCRSSQSLLHSNGNTYLHWYLQKPGQSPKLLIYKVSNRFSG
VPDRFSGSGSGTDFTLKISRVEAEDLGVYFCSQSTHVPYTFGGGTKLEIKRADAAPTVSIFP
PSSEQLTSGGASVVCFLNNFYPKDINVKWKIDGSRQNGVLNSWTDQDSKDSTYSMSSTLT
TKDEYERHNSYTCEATHKTSTSPIVKSFNRNEC

SEQ ID NO. 108

DIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSG
VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRADAAPTVSIFP
PSSEQLTSGGASVVCFLNNFYPKDINVKWKIDGSRQNGVLNSWTDQDSKDSTYSMSSTLT
TKDEYERHNSYTCEATHKTSTSPIVKSFNRNEC

SEQ ID NO. 109

QVQLKQSGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPBGHGLEWIGDIYPGGSYTNNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCARYDNHYFDYWGQGTTLTVSESQSFPNV
FPLVSCESPLSDKNLVAMGCLARDFLPSTISFTWNYQNNTTEVIQGIRTFPTLRTGGKYLATS

QVLLSPKSI LEGSDEYLVCKIHYGGKNRDLHVPIPAVAEMNPNVNVFVPPRDGFSGPAPRKS
KLICEATNFTPKPITVSWLKD GKLVESGFTTDPVTIENKGSTPQTYKVISTLTISEIDWNLN
NVYTCRVDHRGLTFLKNVSSTCAASPSTDILTFTIPPSFADIFLSK SANLTCLVSNLATYET
LNISWASQS GEPLETKIKIMESH PNGTFSAKGVASVCVEDWNNRKEFVCTVTHRDLPSPQKK
FISKPN EVHKHPPAVYLLPPAREQLNLRESATVTCLVKGFSPADISVQWLQRGQLLPQEKYV
TSAPMPEPGAPGFYFTHSILTVTEEEWNSGETYTCVVGHEALPHLV TERTVDKSTGKPTLYN
VSLIMSDTGGTCY

SEQ ID NO. 110

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRP GHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGT TTVTVSESQSFP
NVFPLVSCESPLSDKNLVAMGCLARDFLPSTISFTWNYQNNTEVIQ GIRTFTPLRTGGKYLA
TSQVLLSPKSI LEGSDEYLVCKIHYGGKNRDLHVPIPAVAEMNPNVNVFVPPRDGFSGPAPR
KSKLICEATNFTPKPITVSWLKD GKLVESGFTTDPVTIENKGSTPQTYKVISTLTISEIDWL
NLNVYTCRVDHRGLTFLKNVSSTCAASPSTDILTFTIPPSFADIFLSK SANLTCLVSNLATY
ETLNISWASQS GEPLETKIKIMESH PNGTFSAKGVASVCVEDWNNRKEFVCTVTHRDLPSPQ
KKFISKPN EVHKHPPAVYLLPPAREQLNLRESATVTCLVKGFSPADISVQWLQRGQLLPQEK
YVTSAPMPEPGAPGFYFTHSILTVTEEEWNSGETYTCVVGHEALPHLV TERTVDKSTGKPTL
YNVSLIMSDTGGTCY

mIgM-Karo2 SEQ ID NO. 109

SEQ ID NO. 107

mIgM-Karo4 SEQ ID NO. 110

SEQ ID NO. 108

Chimeric antibodies (mouse/human)

SEQ ID NO. 111

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRP GHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGT TTVTVSGSTKGP
SVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYSLSSV

VTVPSSSLGTQTYICNVNHKPSNTKVDKKVEPKSCDKTHTCPPCPAPELLGGPSVFLFPPKP
KDTLMISRTPEVTCVVDVSHEDPEVKFNWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVL
HQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKG
FYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCFSVMHEALH
NHYTQKSLSLSPGK

SEQ ID NO. 112

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVTVSGSASAP
TLFPLVSCENSPSDTSSVAVGCLAQDFLPDSITLSWKYKNNSDISSTRGFPSVLRGKYAAT
SQVLLPSKDVMQGTDEHVCKVQHPNGNKEKNVPLPVIAELPPKVSFVFPFRDGFNPRKS
KLICQATGFSPRQIQVSWLREGKQVGSGVTDDQVQAEAKESGPTTYKVTSTLTIKESDWLGQ
SMFTCRVDHRGLTFQQNASSMCVPDQDTAIRVFAIPPSFASIFLTKSTKLTCCLVTDLTYYDS
VTISWTRQNGEAVKTHTNISESHPNATFSAVGEASICEDDWNSEGERFTCTVTHTDLPSPKQ
TISRPKGVALHRPDVYLLPPAREQLNLRESATITCLVTGFSPADVVFVQWMQRGQPLSPEKYV
TSAPMPEPQAPGRYFAHSILTVSEEEWNTGETYTCVVAHEALPNRVTERTVDKSTGKPTLYN
VSLVMSDTAGTCY

SEQ ID NO. 113

DIQMTQTPSLPLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFGS
VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHPVPTFGGGTKLEIKRTVAAPSVFIFP
PSDEQLKSGTASVVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYSLSSTLT
SKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

Chimeric antibodies

cIgG-Karo4 SEQ ID NO. 111

SEQ ID NO. 113

cIgM-Karo4 SEQ ID NO. 112

SEQ ID NO. 113